

Frontiers in Gamma Ray Spectroscopy

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Contribution ID : 46

Charged Particle Detector Development for LEB Experiments at NUSTAR

Content :

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In the scope of future slowed down beam campaign at low energy branch (LEB) in NUSTAR, developments have been initiated for a charged particle detector setup for secondary reaction studies. The fast beam, comprising of radioactive species, from Super FRS (cocktail in nature @ 106 pps) will be slowed down in a degrader to Coulomb energies. The resultant output will have a poor quality in terms of energy spread (3 MeV/A to 10 MeV/A) and spot size (~ 5 cm FWHM). For characterization of the slowed down beam, transmission type beam tracking detectors (based on MWPC) are being designed to have time resolutions ~100 ps, position resolutions of ~ 1 mm (in two dimension) and high count rate handling capability (~ 1 MHz). For the nuclear charge (Z) identification of secondary beam species (after the super FRS), it is proposed to develop a high rate gas ionization chamber with stacked tilted electrodes and multiple differential energy loss signals. For experiments with secondary beams, it is proposed to develop a particle identification system based on silicon strip detectors, which will provide energy, timing, position and differential energy loss (DE) information of the secondary reaction products. Development of high density low noise preamplifier to provide energy and timing information has also been initiated. The design details and detector development for the same at IUAC will be presented.

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Session classification : --not yet classified--

Track classification : --not yet classified--

Type : --not specified--